

CLAIMS

What is claimed is:

1. An isolated nucleic acid molecule encoding a cell proliferation-related polypeptide, wherein the polypeptide binds in a yeast two hybrid  
5 assay to a fragment of a protein selected from the group consisting of OsE2F1 (SEQ ID NO: 194), Os018989-4003 (SEQ ID NO: 2), OsE2F2 (SEQ ID NO: 10), OsS49462 (SEQ ID NO: 206), OsCYCOS2 (SEQ ID NO: 210), OsMADS45 (SEQ ID NO: 202), OsRAP1B (SEQ ID NO: 244), OsMADS6 (SEQ ID NO: 236), OsFDRMADS8 (SEQ ID NO: 228), OsMADS3 (SEQ ID  
10 NO: 232), OsMADS5 (SEQ ID NO: 234), OsMADS15 (SEQ ID NO: 240), OsHOS59 (SEQ ID NO: 258), OsGF14-c (SEQ ID NO: 278), OsDAD1 (SEQ ID NO: 292), Os006819-2510 (SEQ ID NO: 296), OsCRTC (SEQ ID NO: 300), OsSGT1 (SEQ ID NO: 310), OsERP (SEQ ID NO: 312), OsCHIB1 (SEQ ID NO: 318), OsCS (SEQ ID NO: 322), OsPP2A-2 (SEQ ID NO: 330),  
15 and OsCAA90866 (SEQ ID NO: 336).
2. The isolated nucleic acid molecule of claim 1, wherein the isolated nucleic acid molecule is derived from rice (*Oryza sativa*).
3. The isolated nucleic acid molecule of claim 1, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence selected from the  
20 group consisting of odd numbered SEQ ID NOs:1-191.
4. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 1-7 and the protein comprises an amino acid sequence of SEQ ID NO: 194.
- 25 5. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of SEQ ID NOs: 9 and 11 and the protein comprises an amino acid sequence of SEQ ID NO: 2.
6. The isolated nucleic acid molecule of claim 3, wherein the isolated  
30 nucleic acid molecule comprises a nucleic acid sequence of one of SEQ ID

NOs: 1 and 13 and the protein comprises an amino acid sequence of SEQ ID NO: 10.

7. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 15-21 and the protein comprises an amino acid sequence of SEQ ID NO: 206.

8. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 15, 17, 23-53 and the protein comprises an amino acid sequence of SEQ ID NO: 210.

9. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 55 and the protein comprises an amino acid sequence of SEQ ID NO: 202.

10. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 57 and the protein comprises an amino acid sequence of SEQ ID NO: 244.

11. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 59 and the protein comprises an amino acid sequence of SEQ ID NO: 236.

12. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 61 and the protein comprises an amino acid sequence of SEQ ID NO: 232.

13. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 63 and the protein comprises an amino acid sequence of SEQ ID NO: 234.

14. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 65 and the protein comprises an amino acid sequence of SEQ ID NO: 240.

15. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd

numbered SEQ ID NOs: 67-79 and the protein comprises an amino acid sequence of SEQ ID NO: 258.

16. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 81  
5 and the protein comprises an amino acid sequence of SEQ ID NO: 260.

17. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 83-97 and the protein comprises an amino acid sequence of SEQ ID NO: 278.

10 18. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of SEQ ID NOs: 89 and 99 and the protein comprises an amino acid sequence of SEQ ID NO: 286.

15 19. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 101-105 and the protein comprises an amino acid sequence of SEQ ID NO: 296.

20 20. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 107 and the protein comprises an amino acid sequence of SEQ ID NO: 300.

21. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of SEQ ID NO: 109 and the protein comprises an amino acid sequence of SEQ ID NO: 304.

25 22. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 111-123 and the protein comprises an amino acid sequence of SEQ ID NO: 310.

23. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd

numbered SEQ ID NOs: 125-147 and the protein comprises an amino acid sequence of SEQ ID NO: 312.

24. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 151-157 and the protein comprises an amino acid sequence of SEQ ID NO: 318.

25. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 159-175 and the protein comprises an amino acid sequence of SEQ ID NO: 322.

26. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 177-185 and the protein comprises an amino acid sequence of SEQ ID NO: 330.

27. The isolated nucleic acid molecule of claim 3, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs: 177, 187-191 and the protein comprises an amino acid sequence of SEQ ID NO: 336.

28. An isolated nucleic acid molecule encoding a cell proliferation-related polypeptide, wherein the nucleic acid molecule is selected from the group consisting of:

- (a) a nucleic acid molecule encoding a polypeptide comprising an amino acid sequence of one of even numbered SEQ ID NOs: 2-192;
- (b) a nucleic acid molecule comprising a nucleic acid sequence of one of odd numbered SEQ ID NOs: 1-191;
- (c) a nucleic acid molecule that has a nucleic acid sequence at least 90% identical to the nucleic acid sequence of the nucleic acid molecule of (a) or (b);

- (d) a nucleic acid molecule that hybridizes to (a) or (b) under conditions of hybridization selected from the group consisting of:
- 5 (i) 7% sodium dodecyl sulfate (SDS), 0.5 M NaPO<sub>4</sub>, 1 mM ethylenediamine tetraacetic acid (EDTA) at 50°C with a final wash in 2X standard saline citrate (SSC), 0.1% SDS at 50°C;
- (ii) 7% SDS, 0.5 M NaPO<sub>4</sub>, 1 mM EDTA at 50°C with a final wash in 1X SSC, 0.1% SDS at 50°C;
- 10 (iii) 7% SDS, 0.5 M NaPO<sub>4</sub>, 1 mM EDTA at 50°C with a final wash in 0.5X SSC, 0.1% SDS at 50°C;
- (iv) 7% sodium dodecyl sulfate (SDS), 0.5 M NaPO<sub>4</sub>, 1 mM EDTA at 50°C with a final wash in 0.1X SSC, 0.1% SDS at 50°C; and
- 15 (v) 7% sodium dodecyl sulfate (SDS), 0.5 M NaPO<sub>4</sub>, 1 mM EDTA at 50°C with a final wash in 0.1X SSC, 0.1% SDS at 65°C;
- (e) a nucleic acid molecule comprising a nucleic acid sequence fully complementary to (a); and
- 20 (f) a nucleic acid molecule comprising a nucleic acid sequence that is the full reverse complement of (a).

29. An isolated cell proliferation-related polypeptide encoded by the isolated nucleic acid molecule of claim 28, or a functional fragment, domain, or feature thereof.

25 30. A method for producing a polypeptide of claim 29, comprising the steps of:

- (a) growing cells comprising an expression cassette under suitable growth conditions, the expression cassette comprising a nucleic acid molecule of claim 28; and
- 30 (b) isolating the polypeptide from the cells.

31.A transgenic plant cell comprising an isolated nucleic acid molecule of claim 1.

32.The transgenic plant of claim 31, wherein the plant is selected from the group consisting of corn (*Zea mays*), *Brassica* sp., alfalfa (5 *Medicago sativa*), rice (*Oryza sativa* ssp.), rye (*Secale cereale*), sorghum (*Sorghum bicolor*, *Sorghum vulgare*), pearl millet (*Pennisetum glaucum*), proso millet (*Panicum miliaceum*), foxtail millet (*Setaria italica*), finger millet (*Eleusine coracana*), sunflower (*Helianthus annuus*), safflower (*Carthamus tinctorius*), wheat (*Triticum aestivum*), soybean (*Glycine max*), tobacco (10 *Nicotiana tabacum*), potato (*Solanum tuberosum*), peanut (*Arachis hypogaea*), cotton, sweet potato (*Ipomoea batatas*), cassava (*Manihot esculenta*), coffee (*Cofea* spp.), coconut (*Cocos nucifera*), pineapple (*Ananas comosus*), citrus trees (*Citrus* spp.), cocoa (*Theobroma cacao*), tea (*Camellia sinensis*), banana (*Musa* spp.), avocado (*Persea utilis*), fig (15 *Ficus casica*), guava (*Psidium guajava*), mango (*Mangifera indica*), olive (*Olea europaea*), papaya (*Carica papaya*), cashew (*Anacardium occidentale*), macadamia (*Macadamia integrifolia*), almond (*Prunus amygdalus*), sugar beets (*Beta vulgaris*), sugarcane (*Saccharum* spp.), oats, duckweed (*Lemna*), barley, a vegetable, an ornamental, and a conifer.

20 33.The transgenic plant of claim 32, wherein the plant is rice (*Oryza sativa* ssp.)

34.The transgenic plant of claim 32, wherein the duckweed is selected from the group consisting of genus *Lemna*, genus *Spirodela*, genus *Woffia*, and genus *Wofiiella*.

25 35.The transgenic plant of claim 32, wherein the vegetable is selected from the group consisting of tomatoes, lettuce, guar, locust bean, fenugreek, soybean, garden beans, cowpea, mungbean, lima bean, fava bean, lentils, chickpea, green bean, lima bean, pea, and members of the genus *Cucumis*.

30 36.The transgenic plant of claim 32, wherein the ornamental is selected from the group consisting of impatiens, Begonia, Pelargonium,

Viola, Cyclamen, Verbena, Vinca, Tagetes, Primula, Saint Paulia, Agertum, Amaranthus, Antihirrhinum, Aquilegia, Cineraria, Clover, Cosmo, Cowpea, Dahlia, Datura, Delphinium, Gerbera, Gladiolus, Gloxinia, Hippeastrum, Mesembryanthemum, Salpiglossos, and Zinnia, azalea, hydrangea, hibiscus, rose, tulip, daffodil, petunia, carnation, poinsettia, and chrysanthemum.

37. The transgenic plant of claim 32, wherein the conifer is selected from the group consisting of loblolly pine, slash pine, ponderosa pine, lodgepole pine, Monterey pine, Douglas-fir, Western hemlock, Sitka spruce, redwood, silver fir, balsam fir, Western red cedar, and Alaska yellow-cedar.

38. The transgenic plant of claim 31, wherein the transgenic plant is a plant selected from the group consisting of Acacia, aneth, artichoke, arugula, blackberry, canola, cilantro, clementines, escarole, eucalyptus, fennel, grapefruit, honey dew, jicama, kiwifruit, lemon, lime, mushroom, nut, okra, orange, parsley, persimmon, plantain, pomegranate, poplar, radiata pine, radicchio, Southern pine, sweetgum, tangerine, triticale, vine, yams, apple, pear, quince, cherry, apricot, melon, hemp, buckwheat, grape, raspberry, chenopodium, blueberry, nectarine, peach, plum, strawberry, watermelon, eggplant, pepper, cauliflower, *Brassica*, broccoli, cabbage, utilian sprouts, onion, carrot, leek, beet, broad bean, celery, radish, pumpkin, endive, gourd, garlic, snapbean, spinach, squash, turnip, utilane, and zucchini.

39. An isolated cell proliferation-related polypeptide, wherein the polypeptide binds in a yeast two hybrid assay to a fragment of a protein selected from the group consisting of OsE2F1 (SEQ ID NO: 194), Os018989-4003 (SEQ ID NO: 2), OsE2F2 (SEQ ID NO: 10), OsS49462 (SEQ ID NO: 206), OsCYCOS2 (SEQ ID NO: 210), OsMADS45 (SEQ ID NO: 202), OsRAP1B (SEQ ID NO: 244), OsMADS6 (SEQ ID NO: 236), OsFDRMADS8 (SEQ ID NO: 228), OsMADS3 (SEQ ID NO: 232), OsMADS5 (SEQ ID NO: 234), OsMADS15 (SEQ ID NO: 240), OsHOS59 (SEQ ID NO: 258), OsGF14-c (SEQ ID NO: 278), OsDAD1 (SEQ ID NO: 292), Os006819-2510 (SEQ ID NO: 296), OsCRTC (SEQ ID NO: 300), OsSGT1 (SEQ ID NO:

310), OsERP (SEQ ID NO: 312), OsCHIB1 (SEQ ID NO: 318), OsCS (SEQ ID NO: 322), OsPP2A-2 (SEQ ID NO: 330), and OsCAA90866 (SEQ ID NO: 336).

40. The isolated cell proliferation-related polypeptide of claim 39, wherein the isolated proliferation-related polypeptide is selected from the group consisting of:

- (a) a polypeptide comprising an amino acid sequence of even numbered SEQ ID NOs: 2-192; and
- (b) a polypeptide comprising an amino acid sequence at least 80% similar to the polypeptide of (a) using the GCG Wisconsin Package SEQWEB® application of GAP with the default GAP analysis parameters.

41. The isolated cell proliferation-related polypeptide of claim 40, wherein the polypeptide comprises an amino acid sequence of one of even numbered SEQ ID NOs: 2-192.

42. An expression cassette comprising a nucleic acid molecule encoding a cell proliferation-related polypeptide of claim 1.

43. The expression cassette of claim 42, wherein the nucleic acid molecule encoding a cell proliferation-related polypeptide comprises a nucleic acid sequence selected from odd numbered SEQ ID NOs: 1-191.

44. The expression cassette of claim 42, wherein the expression cassette further comprises a regulatory element operatively linked to the nucleic acid molecule.

45. The expression cassette of claim 44, wherein the regulatory element comprises a promoter.

46. The expression cassette of claim 45, wherein the promoter is a plant promoter.

47. The expression cassette of claim 45, wherein the promoter is a constitutive promoter.



48. The expression cassette of claim 45, wherein the promoter is a tissue-specific or a cell type-specific promoter.

49. The expression cassette of claim 48, wherein the tissue-specific or cell type-specific promoter directs expression of the expression cassette in a  
5 location selected from the group consisting of epidermis, root, vascular tissue, meristem, cambium, cortex, pith, leaf, flower, seed, and combinations thereof.

50. A transgenic plant cell comprising the expression cassette of claim 42.

10 51. The transgenic plant cell of claim 50, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence of one of odd numbered SEQ ID NOs:1-191.

52. A transgenic plant comprising the expression cassette of claim 42.

53. Transgenic seeds or progeny of the transgenic plant of claim 52.

15 54. A method for modulating proliferation of a plant cell comprising introducing into the plant cell an expression cassette comprising an isolated nucleic acid molecule encoding a cell proliferation-related polypeptide, wherein the polypeptide binds in a yeast two hybrid assay to a fragment of a protein selected from the group consisting of OsE2F1 (SEQ ID NO: 194),  
20 Os018989-4003 (SEQ ID NO: 2), OsE2F2 (SEQ ID NO: 10), OsS49462 (SEQ ID NO: 206), OsCYCOS2 (SEQ ID NO: 210), OsMADS45 (SEQ ID NO: 202), OsRAP1B (SEQ ID NO: 244), OsMADS6 (SEQ ID NO: 236), OsFDRMADS8 (SEQ ID NO: 228), OsMADS3 (SEQ ID NO: 232), OsMADS5 (SEQ ID NO: 234), OsMADS15 (SEQ ID NO: 240), OsHOS59 (SEQ ID NO:  
25 258), OsGF14-c (SEQ ID NO: 278), OsDAD1 (SEQ ID NO: 292), Os006819-2510 (SEQ ID NO: 296), OsCRTC (SEQ ID NO: 300), OsSGT1 (SEQ ID NO: 310), OsERP (SEQ ID NO: 312), OsCHIB1 (SEQ ID NO: 318), OsCS (SEQ ID NO: 322), OsPP2A-2 (SEQ ID NO: 330), and OsCAA90866 (SEQ ID NO: 336).

55. The method of claim 54, wherein expression of the polypeptide in the cell results in an enhancement of a rate or extent of proliferation of the cell.

56. The method of claim 54, wherein expression of the polypeptide in  
5 the cell results in a decrease in a rate or extent of proliferation of the cell.

57. The method of claim 54, wherein the isolated nucleic acid molecule comprises a nucleic acid sequence selected from one of odd numbered SEQ ID NOs: 1-339.

58. The method of claim 57, wherein the isolated nucleic acid  
10 molecule comprises a nucleic acid sequence selected from one of odd numbered SEQ ID NOs: 1-191.